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(54) **SYSTEMS AND METHODS FOR USING CODE SPACE IN SPREAD-SPECTRUM COMMUNICATIONS**

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Adachi F et al: "Wideband multi-rate DS-CDMA for next generation mobile communications systems", Wireless Communications Conference, 1997., Proceedings Boulder, CO, USA Aug. 11-13, 1997, New York, NY, USA, IEEE, US, Aug. 11, 1997, pp. 57-62, XP010245557, DOI: DOI:10.1109/WCC.1997.622247 ISBN: 978-0-7803-41 94-4.

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(52) **U.S. Cl.**
USPC **375/146**

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370/209, 342, 335, 441
See application file for complete search history.

(57) **ABSTRACT**

Systems and methods for improving the performance of direct-sequence spread-spectrum communication systems. In one embodiment, a system comprises at least one communication channel that utilizes two different orthogonal spreading codes and corresponding portions of the available orthogonal code space. Portions of the data processed by the communication channel are demultiplexed into different streams and covered with corresponding, different orthogonal spreading codes. The streams covered by the different orthogonal codes are then combined and transmitted via the same communication channel. One embodiment utilizes at least two different Walsh codes of different lengths (+- and ++--) in order to make use of the three quarters of the Walsh space not utilized by low-rate legacy channels.

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44 Claims, 5 Drawing Sheets

